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UNITED STATES
DEPARTMENT OF AGRICULTURE

DEPARTMENT CIRCULAR 283

Washington, D. C. August, 1923

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SEP 1 . 1923
U. S. DEPARTMENT OF AGRICULTURE

LIVESTOCK POISONING BY COCKLEBUR.

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For many years there have been persistent reports of the poisoning of livestock, more especially swine, by cockleburs. These reports have come to the Department of Agriculture in general correspondence and in special reports from field inspectors. There have also been many similar reports published in veterinary and farm journals and in treatises on poisonous plants. A review of the published statements in regard to the cocklebur poisoning shows marked contradiction in opinions in regard to the toxic properties of these plants. Among those who have thought the plant poisonous there has been no uniformity in regard to the part of the plant which was supposed to do harm. Some have claimed that all the harm, if any, was brought about by the burs and was of a mechanical nature; others have considered the burs poisonous; still others have called the plants poisonous; and some investigators who have made experimental feedings of the plants have claimed that they are entirely harmless.

During the last three years an unusually large number of reports of poisoning have come to the Department of Agriculture. These reports were apparently well substantiated, and it was deemed important to make experimental feedings and determine, if possible, definite facts in regard to losses of livestock by these plants. The experimental work has been carried on partly in Washington, D. C., and partly at the Federal experiment station near Salina, Utah. This circular gives the essential results that are likely to interest stockmen.

DISTRIBUTION OF COCKLEBUR.

Cockleburs grow in most parts of the United States, and the plants are so well known that a description is considered unnecessary. Figure 1 shows a branch of the species, *Xanthium echinatum*, which was used in the experimental work. The plants grow in great abundance in some localities, being found in waste places, growing in especial profusion along the banks of streams and on the shores of ponds and lakes. They germinate in places where there is much moisture in the soil, and, on the shores of temporary lakes, or ponds, will continue to germinate as the water recedes.

Reported cases of poisoning have come from most parts of the United States, but more especially from the States in the Mississippi Valley and in the Great Plains region. Especially heavy losses of animals have been reported from parts of Oklahoma, Texas, and New Mexico.

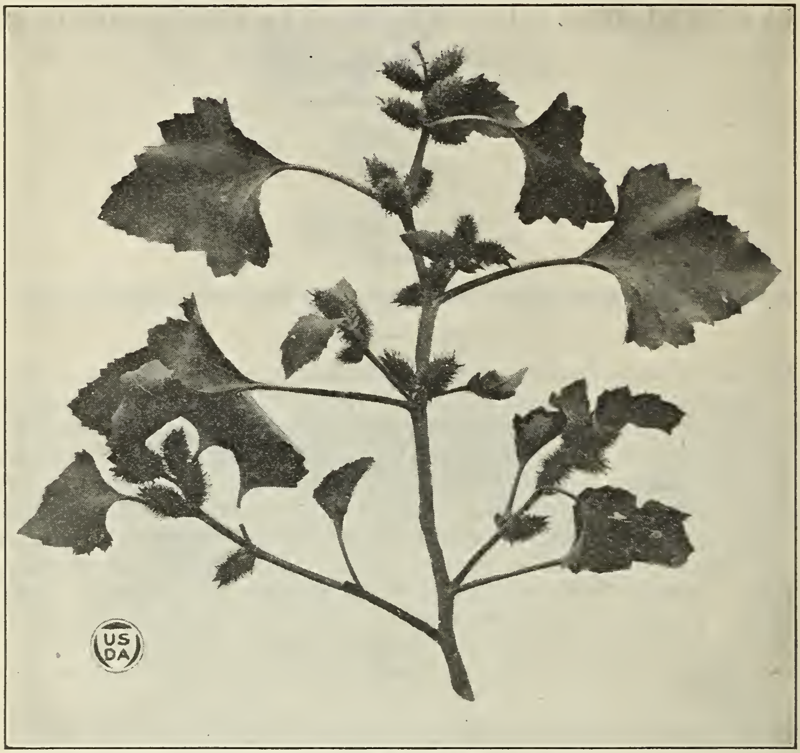

FIG. 1.—A branch of cocklebur, *Xanthium echinatum*, showing the form of the leaves and burs.

RESULTS OF EXPERIMENTAL WORK.

Experimental feedings made on swine, cattle, and sheep showed conclusively that the plant is poisonous to all these animals.

Part of plant poisonous.—It has been claimed by some that swine were killed by eating the burs, either because of the mechanical irritation caused by the spines or by the actual poisonous effect of the burs themselves. It has been said that cases are known in which the burs have matted together either in the esophagus or intestines and caused death. The experimental work of the department neither proves nor disproves these statements but makes it probable that, if the burs do cause injury, the loss from this cause is comparatively slight. Of course, it is well known that burs in the wool of sheep interfere very seriously with the value of the wool.

The experiments show that cases of poisoning occur from eating the young plant just after germination. The statement is sometimes made that the plant is poisonous in the "two-leaved stage." As a matter of fact the poisonous period is during the development of the cotyledons in the stage shown in Figure 2 and before the growth of the leaves. The plant is poisonous while the first pair of leaves is partially developed, but after the growth of the leaves apparently it loses its toxic properties. The plant as it grows develops, in the mature stages, a bitter taste and is rarely if ever eaten by any animal. The seeds are distinctly poisonous, but it is not thought that animals often eat enough of them to do any harm.

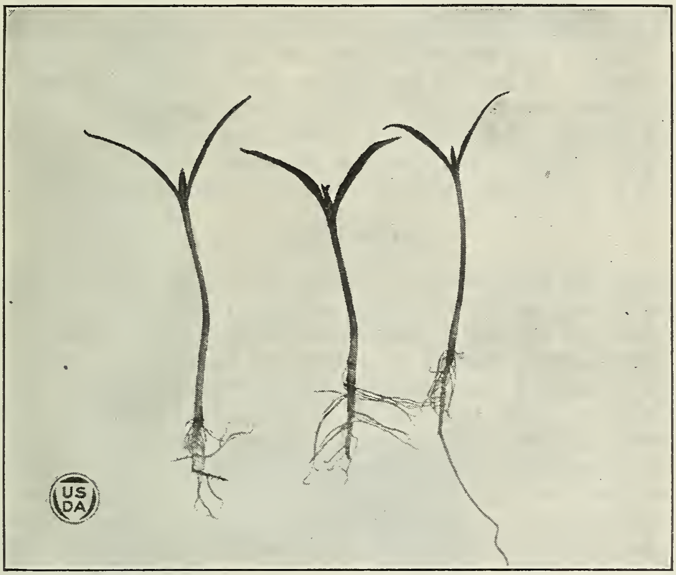

FIG. 2.—Young cocklebur plants. Center plant shows the beginning of the first pair of leaves. The plant is most poisonous at this stage.

Symptoms.—The symptoms of poisoning are depression, nausea accompanied with vomiting, rapid and weak pulse, and a low temperature. Before death there are, frequently, spasmodic movements, but animals sometimes die very quietly. The symptoms ordinarily appear within 24 hours after the plant is eaten and commonly continue for only a few hours.

Lesions.—Autopsies show that there is a more or less marked gastroenteritis, that is, an inflammation of the stomach and of parts of the alimentary canal. This is accompanied with a thickening of the walls of the inflamed tissues. The liver is congested and there is generally a thickening of the walls of the gall bladder and ducts. The bile is viscid. There is an unusual quantity of serum in the abdominal cavity, and there is frequently a jellylike accumulation about the gall bladder and its ducts.

Animals poisoned.—The experiments show that swine, cattle, and sheep may be poisoned. The effects are especially marked in young pigs up to two months of age, and the reported losses of pigs are much greater than those of other animals. The plant, however, will poison cattle or sheep, and there have been some heavy losses of cattle.

Quantity necessary to poison.—While there is considerable variation in the quantity necessary to poison, in general the dose that causes sickness or death is not far from 1½ pounds of the green plant to 100 pounds of animal. This means that a pig weighing 50 pounds would be poisoned by about 12 ounces of the green plant. There seems to be little difference between the dose that causes only sickness and the dose that kills. In the case of pigs most of those poisoned die.

Season when plants are poisonous.—Inasmuch as it is the young plant, before the formation of leaves, that is poisonous, cases of poisoning may occur at any time when young plants are found. As a matter of fact, these cases begin in the latter part of the winter in the Southern States and somewhat later in the Northern States. The losses, however, are not by any means confined to a limited period, but, where there are ponds in which water is gradually evaporating, the young plants will be found growing continuously near the water as the ponds diminish in size, so that the cases of poisoning may occur about such ponds up to the time when the water entirely disappears.

REMEDIES.

Of course, the most obvious remedy is to keep the animals away from these young cocklebur plants, especially when there is a scarcity of other food, or when the animals are very hungry. This is particularly important in regard to a herd of pigs. Cockleburs can be destroyed in limited areas in spite of the fact that they frequently grow in masses. The plant is an annual, and can be exterminated if cut down before the burs have an opportunity to mature. It should be remembered, however, that each mature bur contains two seeds, and that ordinarily only one of these seeds germinates the first year after the maturity of the plant. Therefore, if an attempt is made to exterminate the plant it may be expected that in the succeeding year there will be another crop of the plants from the seeds which failed to germinate the first year.

In regard to medicinal remedies the department is not prepared to make absolute recommendations. There is, however, a method of treatment which experimentally has had very hopeful results. Mrs. A. Creecy, of Raton, N. Mex., told the senior author that when pigs feeding upon cocklebur were given whole milk none of them were poisoned. This method of prevention was tried experimentally and the animals to which milk had been given failed to be poisoned. Following the inference that it was the fat in the milk which brought about this result, experiments were made with bacon grease, lard, and raw linseed oil. These experiments also were successful. Animals to which much more than a fatal dose had been given have been treated with these substances and have shown no symptoms of poisoning. Inasmuch as pigs readily eat salted grease like bacon grease or lard it seems that one may expect good results from the use of these substances. More detailed experiments on this subject are being conducted, but meanwhile this method of treatment is recommended as likely to be beneficial.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1923